



## **DEPARTMENT OF THE INTERIOR**

### **Fish and Wildlife Service**

#### **50 CFR Part 17**

**[Docket No. FWS–R2–ES–2014–0035]**

**[4500030113]**

### **Endangered and Threatened Wildlife and Plants; 12-month Finding on a Petition to List the Tucson Shovel-nosed Snake as Endangered or Threatened**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Notice of 12-month petition finding.

**SUMMARY:** We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding on a petition to list the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) as an endangered or threatened species under the Endangered Species Act of 1973, as amended (Act). After a review of the best available scientific and commercial information, we find that listing the Tucson shovel-nosed snake as an endangered or threatened species is not warranted, and,

therefore, we are removing this subspecies from our candidate list.

**DATES:** The finding announced in this document was made on [INSERT DATE OF FEDERAL REGISTER PUBLICATION].

**ADDRESSES:** This finding is available on the Internet at <http://www.regulations.gov> at Docket Number FWS–R2–ES–2014–0035. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021. Please submit any new information, materials, comments, or questions concerning this finding to the above street address.

**FOR FURTHER INFORMATION CONTACT:** Steve Spangle, Field Supervisor, U.S. Fish and Wildlife Service, Arizona Ecological Services Field Office, 2321 W. Royal Palm Road, Suite 103, Phoenix, AZ 85021; telephone 602–242–0210; facsimile 602–242–2513; email [incomingazcorr@fws.gov](mailto:incomingazcorr@fws.gov). If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800–877–8339.

## **SUPPLEMENTARY INFORMATION:**

### **Background**

Section 4(b)(3)(B) of the Act (16 U.S.C. 1531 *et seq.*) requires that, for any petition to

revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition. In this finding, we will determine that the petitioned action is: (1) Not warranted, (2) warranted, or (3) warranted, but the immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are endangered or threatened, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the Act requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

### **Previous Federal Actions**

We received a petition, dated December 15, 2004, from the Center for Biological Diversity requesting that we list the Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) as an endangered or threatened species throughout its range and designate critical habitat within its range in the United States. The petition, which was clearly identified as such, contained detailed information on the natural history, biology, current status, and distribution of the Tucson shovel-nosed snake. It also contained information on what the petitioner reported as potential threats to the subspecies from urban development, agricultural practices, collecting, inadequacy of existing regulations, drought, and climate change. In response to the petitioner's requests, we sent a letter to the petitioner, dated September 7, 2005, explaining that, due to funding

constraints in fiscal year 2005, we would not be able to address the petition in a timely manner. On February 28, 2006, the petitioner filed a 60-day notice of intent to sue the Department of the Interior for failure to issue 90-day and 12-month findings, and a proposed listing rule, as appropriate, in response to the petition as required by 16 U.S.C. 1533(b)(3)(A) and (B). In response to the notice of intent to sue, we announced our intention to submit a 90-day finding to the **Federal Register** as expeditiously as possible.

On July 29, 2008, we published in the **Federal Register** (73 FR 43905) our 90-day finding that the petition presented substantial scientific information indicating that listing the Tucson shovel-nosed snake may be warranted. On March 31, 2010 (75 FR 16050), we published a 12-month finding on the December 15, 2004, petition to list the Tucson shovel-nosed snake as an endangered or threatened species. In the 12-month finding, we found that listing the Tucson shovel-nosed snake as an endangered or threatened species was warranted but precluded by higher priority actions. Upon publication of the 12-month finding, we added the Tucson shovel-nosed snake to the candidate list. Candidate species are those fish, wildlife, and plants for which we have on file sufficient information on biological status and threats to propose them for listing, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. The Tucson shovel-nosed snake remained a candidate through all of our subsequent annual candidate notices of review (75 FR 69222, November 10, 2010; 76 FR 66370, October 26, 2011; 77 FR 69994, November 21, 2012; and 78 FR 70104, November 22, 2013).

On September 9, 2011, the Service entered into a settlement agreement regarding species on the candidate list in multi-district litigation (Endangered Species Act Section 4 Deadline

Litigation, No. 10–377 (EGS), MDL Docket No. 2165 (D.D.C. May 10, 2011)), which we refer to as the “MDL settlement agreement.” Per the MDL settlement agreement, the Service is required to submit a proposed rule or a not warranted 12-month finding to the **Federal Register** for the Tucson shovel-nosed snake in Fiscal Year 2014, which ends September 30, 2014. This 12-month finding fulfills that requirement of the MDL settlement agreement.

## **Status Assessment for the Tucson Shovel-Nosed Snake**

### *Introduction*

We completed a Species Status Assessment Report for the Tucson Shovel-Nosed Snake (SSA Report; Service 2014, entire), which is available online at <http://www.regulations.gov> under Docket Number FWS–R2–ES–2014–0035.) The SSA Report provides a thorough assessment of Tucson shovel-nosed snake’s biology and natural history, and assesses demographic risks, threats, and limiting factors in the context of determining viability and risk of extinction for the subspecies. In the SSA Report, we compile biological data and a description of past, present, and likely future threats (causes and effects) facing the Tucson shovel-nosed snake. Because data in these areas of science are limited, some uncertainties are associated with this assessment. Where we have substantial uncertainty, we have attempted to make our necessary assumptions explicit in the SSA Report. We base our assumptions in these areas on the best available scientific and commercial data. Importantly, the SSA Report does not represent a decision by the Service on whether this subspecies warrants listing as an endangered or threatened species under the Act. The SSA Report does, however, provide the scientific basis

that informs our regulatory decision (see *Summary of Biological Status and Threats*), which involves the application of standards within the Act and its implementing regulations and Service policies (see **Finding**).

### *Summary of Biological Status and Threats*

The SSA Report documents the results of the comprehensive biological status review for the Tucson shovel-nosed snake and provides a thorough account of the subspecies' overall viability and, conversely, extinction risk (Service 2014, entire). The SSA Report contains the data on which this finding is based. The following is a summary of the results and conclusions from the SSA Report.

The Tucson shovel-nosed snake is a small, non-venomous snake (250–425 millimeters (mm) (9.84–16.73 inches (in)) total length) in the family Colubridae, with a shovel-shaped snout, an inset lower jaw, and coloring that mimics coral snakes (*Micrurus* spp.) (Mahrdt *et al.* 2001, p. 731.1). The Tucson shovel-nosed snake is a subspecies of the western shovel-nosed snake (*Chionactis occipitalis*). The western shovel-nosed snake consists of four subspecies: Colorado Desert shovel-nosed snake (*C. o. annulata*), Mohave shovel-nosed snake (*C. o. occipitalis*), Nevada shovel-nosed snake (*C. o. talpina*), and Tucson shovel-nosed snake. The range of the western shovel-nosed snake extends from southern Nevada and southern California, across southwestern Arizona, and into Mexico. Snakes of the family Colubridae, which includes all shovel-nosed snakes, tend to be abundant in their respective habitats, widely distributed, and chiefly nonvenomous; the family includes the kingsnakes, gartersnakes, and watersnakes. The

Tucson shovel-nosed snake has been recognized as a subspecies of the western shovel-nosed snake since 1941. However, the original subspecies description was based on one color pattern variation compared to the other subspecies. More recent genetic studies, explained in detail below, have clarified that the identification of the subspecies based on color patterning is inaccurate and leads to under-representation of the actual extent of the subspecies' population. The geographical western extent of snakes with this distinguishing color pattern variation was never documented; therefore, the exact range of the subspecies was never described and was thought to be substantially smaller than our current understanding of the range as described below.

At the time of the 2008 90-day and 2010 12-month findings, we accepted the taxonomic status and distribution of the subspecies as described by Mahrtdt *et al.* (2001, entire). The range supported by Mahrtdt *et al.* (2001, entire) encompassed approximately 1,149,367 hectares (ha) (2,840,147 acres (ac)) and extended from Phoenix, Arizona, to Tucson, Arizona. A large intergrade zone was thought to exist where the Tucson shovel-nosed snake's and Colorado Desert shovel-nosed snake's ranges overlapped; an intergrade zone is defined as an area of overlap between the ranges of two subspecies where individuals may possess intermediate characters (attributes or features that distinguish a subspecies, such as coloration) or traits of both subspecies. Snakes within the intergrade zone between Tucson shovel-nosed snake and Colorado Desert shovel-nosed snake possessed color patterns characteristic (or intermediate) of both subspecies. Following our 90-day finding (July 29, 2008; 73 FR 43905), genetic studies involving mitochondrial DNA were conducted to help inform the taxonomy and genetic structure of the Tucson shovel-nosed snake and the intergrade zone. The data from this genetic study

initially suggested that the Tucson shovel-nosed snake was not a valid subspecies. Therefore, we requested peer review and input in September 2008 on the issue of taxonomic classification and distribution of the snake. Four out of six peer reviewers believed that, based on genetic work by Wood *et al.* (2008, entire), the subspecies did not warrant taxonomic recognition; however, the peer reviewers also recognized that more conclusive genetic studies, including microsatellite data, were needed.

These genetic studies were not complete until after our 2010 12-month finding. Our 2010 12-month finding for the Tucson shovel-nosed snake (March 31, 2010; 75 FR 16050) acknowledged the uncertainty of the taxonomy of the snake, but recognized the best available scientific information continued to recognize the Tucson shovel-nosed snake as a subspecies. In the 2010 12-month finding, we continued to recognize the Mahrtdt *et al.* (2001) representation of the range (which was limited to 1,149,367 ha (2,840,147 ac)) with a large intergrade zone with the Colorado Desert shovel-nosed snake subspecies) and description as the best available science at that time. The 2010 12-month finding concluded that listing of the Tucson shovel-nosed snake was warranted but precluded by higher priority listing actions.

Since the publication of our 2010 12-month finding (March 31, 2010; 75 FR 16050), additional genetic work has been conducted for the Tucson shovel-nosed snake. This new genetic work supports that the Tucson shovel-nosed snake is a valid subspecies and that the subspecies occupies a much larger range than previously believed. A U.S. Geological Survey study used both mitochondrial DNA and 11 microsatellite loci to assess whether patterns of population genetic structure follow the spatial structuring of phenotypic variation (variation in



observable characteristics such as shape, color pattern, or even behavior) that originally led to the subspecies description and included samples from all subspecies of the western shovel-nosed snake throughout its range. The results and data from this study were made available to us prior to development of this SSA Report.

We now understand that the western boundary of the estimated range of the Tucson shovel-nosed snake is almost 322 kilometers (km) (200 miles (mi)) west of the range described by Mahrtdt *et al.* (2001) and used by the Service to represent the range of the snake in our 2010 12-month finding (see Figure 3 of the SSA Report). The estimated range supported in the U.S. Geological Survey study includes approximately 2,000,655 ha (4,943,728 ac) more than the range we identified in our 2010 12-month finding; this represents a 274 percent increase in our understanding of the estimated range of the subspecies. We recognize that there is considerable color pattern variation throughout the range of the Tucson shovel-nosed snake; however, the genetic data indicate that, despite the color pattern expressed, snakes previously thought to be a different subspecies within this range are genetically Tucson shovel-nosed snakes. Based on this new information, the current estimated range of the snake encompasses 3,150,022 ha (7,783,875 ac) of land.

The current estimated range of the Tucson shovel-nosed snake includes Pinal, Maricopa, Yavapai, Yuma, Pima, and La Paz Counties in central and western Arizona. Although little is known about the specific habitat requirements of the Tucson shovel-nosed snake within its current estimated range, the subspecies is generally found within the Arizona Upland and Lower Colorado River Valley subdivisions (regions with diverse and distinctive vegetation) of the

Sonoran Desertscrub biotic community, in areas containing: (1) soils comprised of soft, sandy loams, with sparse gravel; and (2) sufficient prey items (insects and other arthropods). Of the total estimated range, 1,835,591 ha (4,535,845 ac) (approximately 58 percent) contain the appropriate Sonoran Desertscrub habitat for the snake (see Figure 1 of the SSA Report).

In conducting our status assessment, we first considered what the Tucson shovel-nosed snake needs to ensure viability. We generally define viability as the ability of the species to persist over the long term and, conversely, to avoid extinction. We then evaluated whether or not the vital resources needed for the snake's persistence currently exist and the repercussions to the subspecies when those resources are missing, diminished, or inaccessible. We next consider the factors that may interfere with the snake's needs, including historical, current, and future factors. Finally, considering the information reviewed, we evaluated the current status and future viability of the subspecies in terms of resiliency, redundancy, and representation.

Resiliency is having sufficiently large populations for the subspecies to withstand stochastic events; in the case of the Tucson shovel-nosed snake, resiliency is likely best measured by the extent of what the best available information describes as suitable habitat: intact Sonoran Desertscrub vegetation that contains soft, sandy loam soils, and supports abundant prey. Although we do not have specific metrics on population health or abundance for the Tucson shovel-nosed snake, we assume that distribution of suitable habitat is an appropriate surrogate to indicate resiliency for this subspecies because snakes are distributed throughout the entirety of their range and we assume that these snakes generally occupy areas where suitable habitat exists. Redundancy is having a sufficient number of populations for the subspecies to

withstand catastrophic events within part of its range and can be measured through the duplication and distribution of resilient populations across its range. Representation is having the breadth of genetic makeup of the subspecies to adapt to changing environmental conditions and can be measured by the genetic diversity within and among populations, and the ecological diversity of populations across the subspecies' range. In the case of the Tucson shovel-nosed snake, we evaluated representation based on the extent of the current estimated geographical range and the variability of habitat characteristics within this range as indicators of genetic and ecological diversity.

For the Tucson shovel-nosed snake to be considered viable, individual snakes need the specific vital resources for survival and completion of their life cycles. Although there is a general lack of information regarding what the necessary vital resources are for the Tucson shovel-nosed snake to complete its life cycle, one study indicated that this snake selected habitat that included scattered sand hummocks (low mounds or ridges), crowned with mesquite or other desert shrubs, which can provide refuges for shovel-nosed snakes. The Tucson shovel-nosed snake is also found in creosote-mesquite floodplain environments, as well as sandy dunes, desert washes and valleys, and bajadas, most frequently in sparsely vegetated, sandy to gravelly habitats, and is less abundant in rocky terrain. Specifically, snakes are found within the Arizona Upland and Lower Colorado River Valley subdivisions of the Sonoran Desertscrub biotic community, in areas containing: (1) soils comprised of soft, sandy loams, with sparse gravel; and (2) sufficient prey items (insects and other arthropods).

We assume that the presence of the appropriate habitat types (as described above)

throughout the subspecies' range provides sufficient area and suitable habitat to support the subspecies. This is because the Tucson shovel-nosed snake appears to be a habitat generalist occurring within the relatively broad biotic community described above. From an ecological perspective, the term habitat generalist describes a species that can tolerate a relatively wide range of environmental conditions, whereas habitat specialists can only tolerate a relatively narrow range of environmental conditions. Tucson shovel-nosed snakes are often found in open areas with sparse vegetation, and there are no specific habitat requirements for the percent vegetative cover preferred by this species. Rather, the subspecies' general requirements include proper soil and vegetation types, which provide both cover from predators and habitat for prey items. Additionally, connectivity between populations is essential to maintain diversity and the ability to find mates. Because generalists can tolerate a wider range of environmental conditions, they can generally adapt to minor, localized environmental changes within their broader habitat. Thus, the Tucson shovel-nosed snake is likely most sensitive to habitat changes that entirely remove suitable habitat from the subspecies' range rather than changes that result only in habitat modification. For these reasons, we focused our analysis in the SSA Report on landscape-scale stressors that could result in habitat loss.

Within the redefined range of the subspecies, we do not have systematic survey data for habitat or population abundance estimates, and there are no minimum viable population estimates for the Tucson shovel-nosed snake. Throughout the areas within the subspecies' range that have had systematic surveys, populations of snakes appear to be stable (available information indicates that the species status neither improved nor declined since the last reporting period; i.e., population numbers remained constant) and persisting according to the

survey data and analyses (Rosen 2003, entire; Rosen 2004; all and 2008b, entire; Arizona Game and Fish Department 2008, p. 2; Mixan and Lowery 2008, entire; Grandmaison and Abbate 2011, entire; Jones *et al.* 2011, p. 65; Grandmaison *et al.* 2012, entire; Leavitt *et al.* 2013a, entire). While we do not have specific data for densities of Tucson shovel-nosed snakes throughout their range, collection data indicate that the subspecies is found throughout the entirety of its estimated range (see Figure 6 in the SSA Report). We expect areas of unsurveyed, suitable habitat to support similar populations to those areas that have been systematically surveyed because density of a species tends to be greatest near the center of its range and gradually declines toward the boundaries (Brown 1984, p. 258) and collection data generally tends to be biased towards areas that are more easily accessed by surveyors, such as along paved roads. In this case, based on the proximity of snakes collected to adjacent areas of unsurveyed, suitable snake habitat, including more inaccessible areas of suitable habitat, we assume that the Tucson shovel-nosed snake occupies these unsurveyed areas where suitable habitat exists. This conclusion is consistent with population data for Tucson shovel-nosed snakes in similar habitats throughout its range. Each collection location in Figure 6 of the SSA Report represents multiple individuals collected at each site. For example, although there are three locality points in La Paz County in the western portion of the range, we have data in our files for 11 Tucson shovel-nosed snakes collected at those three points. Many times, specimens are collected in close proximity to each other and are represented by a single point on the map. Therefore, while Figure 6 of the SSA Report represents what we know regarding the distribution of the Tucson shovel-nosed snake, it underestimates the actual number of snakes collected or sampled at these locations. Overall, we expect that the subspecies' populations throughout the snake's range currently have fairly similar population abundances to the areas that have been surveyed (please refer to Chapter

4 “Species Current Conditions” of the SSA Report).

Potential threats to the viability of the Tucson shovel-nosed snake occur in the form of urban development, solar facilities, and roads associated with both urban development and solar facilities. These various factors result in habitat loss, thereby contributing to the potential decline or extirpation of local populations of Tucson shovel-nosed snakes. Because the snake is a habitat generalist (as described above), we assume that the presence of the appropriate habitat types will contribute to the viability of the subspecies and that the removal of these habitat types due to development will decrease the subspecies’ viability. Thus, the potential threats we analyzed in the SSA Report focus on the factors that may result in habitat loss. We evaluated these factors in the near term (over about the next 10 years) and into the future (over the next 11 to 50 years). Based on our analysis of the subspecies and the factors affecting it in the future, we believe that 50 years is the longest length of time that we can reliably predict the future habitat conditions of the subspecies’ range. This is because the potential threats to the subspecies focus on loss of suitable habitat, and our projections of management of lands upon which the subspecies relies is limited to approximately 50 years.

Based on the best scientific and commercial data available, the Tucson shovel-nosed snake occupies a range of 3,150,022 ha (7,783,875 ac), with 1,835,591 ha (4,535,845 ac) of the current estimated range being suitable habitat, and habitat development will impact only a small percentage of that range. Currently, 608,433 ha (1,503,472 ac) of land within the estimated range of the Tucson shovel-nosed snake falls within 31 municipal boundaries; the majority of the areas within these municipal boundaries have either already been developed or are planned for

some level of development. Large areas of existing urban development and planned development that overlap with the subspecies' habitat primarily occur in the eastern and north-central portion of its range along the Interstate 10 corridor between Tucson and Phoenix; however, we do not have information to indicate when the planned communities will be developed or how much Tucson shovel-nosed snake habitat would be lost as a result. Thus, our analysis includes the total area of all municipalities, and we assume that all areas would be developed within each municipality. We did not differentiate between existing and potential future development; rather, we assumed all currently or reasonably potentially developed municipal lands would be lost to the subspecies. These areas of existing or potential future development represent approximately 19 percent of the 3,150,022 ha (7,783,875 ac) of the current estimated range of the Tucson shovel-nosed snake. These area of existing or potential future development are 33 percent of the 1,835,591 ha (4,535,845 ac) of Tucson shovel-nosed snake suitable habitat. We anticipate, but did not quantify or rely on, that the area that would be developed would be less than the total area described above, resulting in a reduced contribution to potential habitat loss than the maximum projected if all of this development occurs.

Lands managed by the Arizona State Land Department (ASLD) containing habitat for the Tucson shovel-nosed snake are prevalent throughout much of its range (see Figure 2 of the SSA Report), and these ASLD lands have the potential to be sold for development, especially to facilitate growth around Phoenix and in western Pinal County. For example, Superstition Vistas, a large master planned community of approximately 275 square miles (712 square kilometers) located between Florence and Apache Junction, has been conceptually planned by the ASLD, and this plan has been incorporated into Pinal County's Comprehensive Plan

(<http://www.superstition-vistas.org>). These ASLD lands where development may occur are included in the percentage of lands subject to existing or potential future development within the Tucson shovel-nosed snake's range. However, many of these ASLD lands, especially in the western portion of the subspecies' range, are so remote that we do not reasonably anticipate them being developed in the foreseeable future. Regardless, we included the potential development of these lands in our analysis of existing and potential future development. Other areas like Superstition Vistas are highly likely to be developed in the coming years. In most cases, community master plans indicate that these developments may incorporate open space areas containing habitat for the snake. These open space areas are anticipated to maintain some degree of suitable habitat for the Tucson shovel-nosed snake, although we do not know to what extent these areas would contribute to the snake's viability. Overall, at least in the near future, these ASLD lands are expected to continue to contribute to the resiliency, redundancy, and representation of the snake throughout its range. However, in the long term, some of these ASLD lands may be developed and contribute to habitat loss, and were considered in the SSA Report as potential lost habitat to the subspecies.

Similar to urban development, solar energy development and associated transmission corridors may contribute to habitat loss affecting the Tucson shovel-nosed snake. All of these activities may impact the subspecies through removal and potential contamination of remaining habitat and increased potential for road kill. Currently, there is one approved solar facility and two applications for new solar facilities that have been received by the Bureau of Land Management (BLM) within the range of the snake. The approved facility does not have a power purchase agreement; therefore, we are uncertain if or when it will actually be constructed. We



also are uncertain whether the facilities associated with the two applications will be approved or built. If all three of the solar facilities are constructed, the resulting habitat lost would include approximately 7,070 ha (17,472 ac). This comprises less than one percent of the land within suitable habitat of the current estimated range of the snake. If all three of these facilities are constructed, there would likely be some level of diminished resiliency associated with local populations of snakes. However, the overall redundancy and representation of populations is expected to remain at current levels due to the size of the subspecies' range and the fact that these solar facilities are anticipated to be limited in occurrence, only removing a small fraction of available habitat compared to the total habitat available to snakes throughout their range.

Roadways and transportation corridors raise similar concerns for the Tucson shovel-nosed snake. In most instances, new roads would be associated with urban development or solar facilities. Roadways may remove suitable habitat for the snake and could result in fatality of individuals. However, data in our files indicate that populations of Tucson shovel-nosed snakes are currently persisting along roads in areas of high traffic use. Although roads have been documented to be detrimental to snakes, particularly individuals, long-term studies show that they do not have as significant an effect on the resiliency or redundancy of populations as previously believed. Off-highway vehicle (OHV) use could also have similar affects to Tucson shovel-nosed snakes through habitat degradation when these vehicles create new trails. However, OHV use is most likely to occur on ASLD or private lands near larger urban developments, because OHV use is restricted on public lands throughout the subspecies' range. Thus, the limited use of OHVs on most BLM lands, which encompasses a large portion of lands with the subspecies' current estimated range, is not expected to reduce resiliency and redundancy

of the subspecies throughout its range.

Although there are some potential impacts to the Tucson shovel-nosed snake resulting from urban development, solar development, and roads associated with both forms of development, the estimated range of the Tucson shovel-nosed snake includes large tracts of lands managed by the BLM that contain suitable habitat for the snake. Collectively, these specially managed areas include approximately 770,163 ha (1,903,115 ac), which represents approximately 42 percent of the 1,835,591 ha (4,535,845 ac) of the suitable habitat within the current estimated range of the Tucson shovel-nosed snake. These lands include wilderness areas, Areas of Critical Environmental Concern (ACECs), national monuments, and a wilderness study area. In addition to these designated areas, there are several other tracts of BLM land that are managed for wilderness characters and wildlife habitat within the range of the subspecies. Although none of these lands are specifically managed for the benefit of the Tucson shovel-nosed snake, they are managed to maintain their natural state. As discussed previously, the subspecies is a habitat generalist, and we assume that general habitat management of these specially managed BLM lands will contribute to maintenance of suitable habitat for the subspecies. Further, we expect that these specially managed lands will be protected from potential impacts in the foreseeable future and, thus, are likely to continue to provide suitable habitat for the Tucson shovel-nosed snake into the future. BLM lands outside of these special management areas are still subject to multiple-use management, primarily livestock grazing and recreational use, including OHV use. However, we have no evidence that the effects of livestock grazing are a threat to Tucson shovel-nosed snakes, and OHV use is restricted to existing routes under all BLM Land and Resource Management Plans. Therefore, BLM lands that allow for

livestock grazing and limited OHV use will continue to provide suitable habitat for the Tucson shovel-nosed snake.

Although most of the BLM land within the subspecies' range occurs in the eastern portion of the Tucson shovel-nosed snake's range, the western portion of the snake's range also includes large tracts of land managed by the ASLD. This land can be sold at any time for the benefit of the State Trust Land beneficiaries, but these lands in the western portion of the snake's range are remote, and many are currently used for livestock grazing. Therefore, we do not expect them to be sold in the foreseeable future and anticipate that they will remain as suitable habitat for the Tucson shovel-nosed snake. ASLD lands in the eastern portion of the range of the snake have high potential for development; however, as discussed above, they represent only a limited portion of the suitable habitat available throughout the range of the snake. Because these ASLD lands currently appear to support suitable Sonoran Desertscrub habitat for the Tucson shovel-nosed snakes and the subspecies is a habitat generalist, we assume that large tracts of specially managed BLM land and remote ASLD land provide habitat for the snake. In addition, we have location data that indicate the snake is relatively evenly distributed throughout its range, including on these protected lands (see "Abundance" section of the SSA Report).

In summary, we evaluated a variety of different factors that could contribute to habitat loss for the subspecies. Urban development has the highest potential to occur within the subspecies' range and is likely to cause some level of habitat loss affecting the Tucson shovel-nosed snake. Urban development is most likely to occur in the eastern and north-central portion of the snake's range along the Interstate 10 corridor between Phoenix and Tucson and other

outlying areas. If this predicted urban development occurs at the high-end estimates we discuss in the SSA Report, the total habitat lost is estimated to be approximately 33 percent of the Tucson shovel-nosed snake's suitable habitat. Conversely, protected lands will likely continue to provide suitable habitat for the Tucson shovel-nosed snake. Large areas of BLM land, including vast areas of specially managed lands, containing suitable habitat occur throughout the range of the subspecies. These specially managed BLM lands include approximately 42 percent of the suitable habitat throughout the snake's current estimated range. All of these public lands containing habitat for the Tucson shovel-nosed snake are expected to be managed as such in perpetuity, ensuring continued resiliency, redundancy, and representation of snake populations throughout its range. Overall, we expect some level of habitat loss to result from urban development, solar energy development, and roads associated with both forms of development. However, these impacts do not currently have, nor are they likely to have in the future, a significant species-level effect because much of the development has already occurred, and the spatial and temporal effect of development into the foreseeable future will be limited and is offset by the presence of protected lands. Our new understanding of the size of the subspecies' range, the snake's known distribution throughout its range, and the lack of pervasive threats throughout its range indicate the existence of the necessary resources for the subspecies' persistence now and in the long term, even if development occurs as described above. In conclusion, due to the distribution and extent of suitable habitat within the subspecies' current estimated range, the subspecies exhibits resiliency, redundancy, and representation such that it does not meet the definition of an endangered or a threatened species under the Act.

**Finding***Standard for Review*

Section 4 of the Act, and its implementing regulations at 50 CFR part 424, set forth the procedures for adding species to the Federal Lists of Endangered and Threatened Wildlife and Plants. Under section 4(b)(1)(a) of the Act, the Secretary is to make endangered or threatened species determinations required by the section 4(a)(1) solely on the basis of the best scientific and commercial data available to her after conducting a review of the status of the species and after taking into account conservation efforts by States or foreign nations. The standards for determining whether a species is an endangered or threatened species are provided in section 3 of the Act. An endangered species is any species that is “in danger of extinction throughout all or a significant portion of its range.” A threatened species is any species that is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” Per section 4(a)(1) of the Act, in reviewing the status of the species to determine if it meets the definition of “an endangered species” or of a “threatened species,” we determine whether any species is an endangered or threatened species because of any of the following five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; and (E) other natural or manmade factors affecting its continued existence.

Until recently, the Service has presented its evaluation of information under the five

listing factors in an outline format, discussing all of the information relevant to any given factor and providing a factor-specific conclusion before moving to the next factor. However, the Act does not require findings under each of the factors, only an overall determination as to status (e.g., endangered species, threatened species, not warranted). Ongoing efforts to improve the efficiency and efficacy of the Service's implementation of the Act have led us to present this information in a different format that we believe leads to greater clarity in our understanding of the science, its uncertainties, and the application of our statutory framework to that science. Therefore, while the presentation of information in this rule differs from past practice, it differs in format only. We have evaluated the same body of information we would have evaluated under the five listing factors outline format, we are applying the same information standard, and we are applying the same statutory framework in reaching our conclusions.

#### *Endangered or Threatened Species Throughout Its Range*

Subsequent to our 2010 12-month finding, substantial new information has become available related to the genetics, range, and distribution of the Tucson shovel-nosed snake. On the basis of our biological review documented in the SSA Report, we have found merit in the recent genetic work presented in Wood *et al.* (2014, entire) and have revised our understanding of the range of the Tucson shovel-nosed snake based on this genetic information. As a result, the range of the Tucson shovel-nosed snake is considerably larger than the range we considered in our 2010 12-month finding. Therefore, in the associated SSA Report, we evaluated the various past, current, and future stressors known to negatively affect the Tucson shovel-nosed snake, but we expanded our analysis to include the entirety of the redefined range of the subspecies.

The primary past, current, and ongoing stressor to the Tucson shovel-nosed snake is habitat loss resulting from existing and potential future urban development. Secondary sources of habitat loss likely to affect the subspecies on a smaller-scale include solar energy development, road construction and maintenance, conversion of lands to agricultural use, wildfires, climate change, and drought. All of these stressors related to habitat loss are likely the most significant to the subspecies because they have the potential to remove Sonoran Desertscrub habitat that is necessary for individuals to complete their life history and for populations to maintain resiliency supported by sufficient intact tracts of habitat. Our analysis acknowledges that stressors resulting in habitat loss, including urban development, will continue to occur in portions of the Tucson shovel-nosed snake's range; however, we evaluated the scope and effect of these stressors throughout the subspecies' redefined range, and conclude that these stressors are limited to a small portion of the subspecies' range. Furthermore, a meaningful portion of the range of the Tucson shovel-nosed snake is, and will be, protected for the foreseeable future under existing specific management by the BLM that is focused on maintaining intact Sonoran Desertscrub habitat. As a result, we expect stressors resulting in habitat loss may diminish the resiliency of local snake populations in portions of the subspecies' range but will not reduce the subspecies' resiliency, redundancy, and representation throughout its range. We conclude that adequate suitable habitat for the Tucson shovel-nosed snake will be available for the foreseeable future.

Other potential stressors that we evaluated include overutilization for commercial and scientific purposes, disease, and predation. Unregulated take of Tucson shovel-nosed snakes is

likely infrequent because specimens can be difficult to locate in the wild and are similar in appearance to venomous coral snakes, causing humans to be less likely to capture them. Disease has not been documented in Tucson shovel-nosed snakes, and, while predation by a variety of carnivores is known to occur, there is no information suggesting that predation occurs at higher levels than expected in a normally functioning ecosystem. Thus, these stressors are not reducing the subspecies' resiliency, redundancy, or representation and, therefore, are not reducing its viability.

Tucson shovel-nosed snakes are found throughout the entirety of their redefined range, and it does not appear that the various stressors described above are occurring at such a magnitude that they are diminishing the subspecies' resiliency, redundancy, and representation throughout its range. Furthermore, the genetic work by Wood *et al.* (2014, entire) indicate that there is substantial genetic variability within the Tucson shovel-nosed snake, and that there appears to be ongoing exchange of genetic material within Tucson shovel-nosed snake populations, as well as among the subspecies of the western shovel-nosed snake. We are not aware of any other potential stressors or threats that may impact the subspecies or its habitat individually or in combination, as further discussed in the SSA Report. Because the Tucson shovel-nosed snake is a habitat generalist and due to the distribution and extent of suitable habitat within the Tucson shovel-nosed snake's estimated range, the subspecies exhibits resiliency, redundancy, and representation such that it does not meet the definition of an endangered or threatened species. Therefore, we find that listing the Tucson shovel-nosed snake as an endangered or a threatened species throughout its range is not warranted.



*Distinct Vertebrate Population Segment*

Because we find that the Tucson shovel-nosed snake does not warrant listing as endangered or threatened throughout its range, we next consider whether there is an alternative characterization of the subspecies that may warrant listing under the Act as defined by policy or regulation. The Act provides for the consideration of listing of distinct vertebrate population segments (DPSs) as defined within section 3 of the Act. Under the Service's Policy Regarding the Recognition of Distinct Vertebrate Population Segments under the Endangered Species Act (DPS Policy; 61 FR 4722, February 7, 1996), three elements are considered in the decision concerning the establishment and classification of a possible DPS. These are applied similarly for addition to or removal from the Federal List of Endangered and Threatened Wildlife. These elements include:

- (1) The discreteness of a population in relation to the remainder of the species to which it belongs;
- (2) The significance of the population segment to the species to which it belongs; and
- (3) The population segment's conservation status in relation to the Act's standards for listing, delisting, or reclassification (i.e., is the population segment endangered or threatened).

**Discreteness**

Under the DPS Policy, a population segment of a vertebrate taxon may be considered discrete if it satisfies either one of these conditions:

(1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation.

(2) It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

With regard to the Tucson shovel-nosed snake, our evaluation of the status of this subspecies, as outlined in the SSA Report, indicates that the snake does not meet the criteria for discreteness required by our DPS policy. The best available scientific information indicates that there are no physical, physiological, ecological, or behavioral factors within the range of the Tucson shovel-nosed snake that point to any segment of the population being discrete. Genetic work shows genetic diversity and evidence of genetic exchange across the range of the snake, indicating that populations within the range are interacting and are not discrete (Wood *et al.* 2008, entire; Wood *et al.* 2014, entire). Furthermore, the Tucson shovel-nosed snake is not delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act. Because there are no discrete population segments within the Tucson shovel-nosed snake, it is unnecessary for us to complete any further analysis under the DPS policy.

#### *Significant Portion of the Range*

Under the Act and our implementing regulations, a species may warrant listing if it is an endangered or a threatened species throughout all or a significant portion of its range. The Act defines “endangered species” as any species which is “in danger of extinction throughout all or a significant portion of its range,” and “threatened species” as any species which is “likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” The term “species” includes “any subspecies of fish or wildlife or plants, and any distinct population segment [DPS] of any species of vertebrate fish or wildlife which interbreeds when mature.” We published a final policy interpreting the phrase “significant portion of its range” (SPR) (79 FR 37578, July 1, 2014). The final policy states that (1) if a species is found to be an endangered or a threatened species throughout a significant portion of its range, the entire species is listed as an endangered or a threatened species, respectively, and the Act’s protections apply to all individuals of the species wherever found; (2) a portion of the range of a species is “significant” if the species is not currently an endangered or a threatened species throughout all of its range, but the portion’s contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range; (3) the range of a species is considered to be the general geographical area within which that species can be found at the time the Service or the National Marine Fisheries Service makes any particular status determination; and (4) if a vertebrate species is an endangered or a threatened species throughout an SPR, and the population in that significant portion is a valid DPS, we will list the DPS rather than the entire taxonomic species or subspecies.

The SPR policy is applied to all status determinations, including analyses for the

purposes of making listing, delisting, and reclassification determinations. The procedure for analyzing whether any portion is an SPR is similar, regardless of the type of status determination we are making. Where we have found that the species is neither an endangered nor a threatened species throughout all of its range, we next determine whether the species is an endangered or a threatened species throughout a significant portion of its range. If it is, we list the species as an endangered or a threatened species, respectively; if it is not, we conclude that listing the species is not warranted.

When we conduct an SPR analysis, we first identify any portions of the species' range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant and either an endangered or a threatened species. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. Answering these questions in the affirmative is not a determination that the species is an endangered or a threatened species throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required. A key part of this analysis is whether the threats are geographically concentrated in some way. If the threats to the species are affecting it uniformly throughout its range, no portion is likely to warrant further consideration. Moreover, if any concentration of threats applies only to portions of the range that clearly do not meet the biologically based definition of “significant” (i.e., the loss of that portion clearly would not be expected to increase the vulnerability to extinction of the

entire species), those portions will not warrant further consideration.

If we identify any portions that may be both (1) significant and (2) endangered or threatened, we engage in a more detailed analysis to determine whether these standards are indeed met. The identification of an SPR does not create a presumption, prejudgment, or other determination as to whether the species in that identified SPR is an endangered or a threatened species. We must go through a separate analysis to determine whether the species is an endangered or a threatened species in the SPR. To determine whether a species is an endangered or a threatened species throughout an SPR, we will use the same standards and methodology that we use to determine if a species is an endangered or a threatened species throughout its range.

Depending on the biology of the species, its range, and the threats it faces, it may be more efficient to address the “significant” question first, or the status question first. Thus, if we determine that a portion of the range is not “significant,” we do not need to determine whether the species is an endangered or a threatened species there; if we determine that the species is not an endangered or a threatened species in a portion of its range, we do not need to determine if that portion is “significant.”

We considered whether there are any significant portions of the range where the Tucson shovel-nosed snake is in danger of extinction or is likely to become endangered in the foreseeable future by reviewing the SSA Report with respect to the geographic concentration of threats, and the significance of portions of the range to the conservation of the subspecies. However, there were no portions of the subspecies’ range that we considered biologically

“significant” because the habitat conditions and distribution of the snake were generally similar across the entire subspecies’ range and there is relatively high genetic diversity across the entire range. Therefore, we next chose to identify any portions of the Tucson shovel-nosed snake’s range where the subspecies may be in danger of extinction or likely to become so within the foreseeable future. We concluded that the best available information indicates that the impacts identified in the SSA Report do not occur uniformly throughout the range of the Tucson shovel-nosed snake. The most significant impact to the Tucson shovel-nosed snake is urban development and associated activities. The SSA Report describes that the majority of urban development has occurred and will likely continue to occur within the north-central and eastern portions of the Tucson shovel-nosed snake’s range, primarily along the Interstate 10 corridor. Because urban development represents a permanent loss of Tucson shovel-nosed snake habitat, it is within these areas that the extent of the impact could be such that the Tucson shovel-nosed snake in this portion of the range may be in danger of extinction or is likely to become endangered in the foreseeable future. Having identified this portion of the range as potentially having endangered or threatened status, we must next determine if this portion of the range is significant. As described above, we would consider such a portion of the range significant if, should that portion of the range be theoretically extirpated, the species in the remaining portion of the range would be in danger of extinction now or in the foreseeable future (in other words, endangered or threatened). The best available information suggests that, should the Tucson shovel-nosed snake be extirpated from areas of urban development in the north-central and eastern portions of its range, the remainder of its range would retain adequate resiliency, redundancy, and representation. There are no significant stressors to the remainder of the range of the subspecies due, in large part, to the large areas of habitat that would remain protected into

the foreseeable future. Therefore, we find that the Tucson shovel-nosed snake is not in danger of extinction now, or likely to become so in the foreseeable future, in a significant portion of its range.

Based on the information presented in the SSA Report for the Tucson shovel-nosed snake, and on the discussion above, we find that the best available scientific and commercial information does not indicate that the threats to the Tucson shovel-nosed snake rise to the level of significance such that this subspecies is in danger of extinction now or likely to become so in the foreseeable future throughout all or a significant portion of its range. As a result, we have determined that this subspecies does not meet the definition of an endangered or threatened species under the Act and are subsequently removing this subspecies from our candidate list.

## **References Cited**

A complete list of references cited is available in the SSA Report (Service 2014, pp. 69–74), available on the Internet at <http://www.regulations.gov> at Docket Number FWS–R2–ES–2014–0035, and upon request from the Arizona Ecological Services Field Office (see **ADDRESSES**).

## **Authors**

The primary authors of this notice are the staff members of the Arizona Ecological Services Field Office.

**Authority**

The authority for this section is section 4 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: September 9, 2014.

Rowan W. Gould,

Acting Director, U.S. Fish and Wildlife Service.

~~{Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List  
the Tucson shovel-nosed snake as Endangered or Threatened}~~

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